

## LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) McGuire Nuclear Station - Unit 1	DOCKET NUMBER (2) 0 5 0 0 0 3 6 9	PAGE (3) 1 OF 0 3
---	--------------------------------------	----------------------

TITLE (4)

Reactor Trip Following Driver Card Failure

EVENT DATE (5)			LER NUMBER (6)		REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES
0 1	0 5	8 6	8 6	0 0 2	0 0	0 2	0 4	8 6	
									DOCKET NUMBER(S) 0 5 0 0 0

OPERATING MODE (9) 1		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR § (Check one or more of the following): (11)							
POWER LEVEL (10) 1 0 0	20.402(b)	20.405(c)	<input checked="" type="checkbox"/>	50.73(a)(2)(iv)	73.71(b)				
	20.405(a)(1)(i)	50.38(c)(1)		50.73(a)(2)(v)	73.71(c)				
	20.405(a)(1)(ii)	50.38(c)(2)		50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)				
	20.405(a)(1)(iii)	50.73(a)(2)(i)		50.73(a)(2)(viii)(A)					
	20.405(a)(1)(iv)	50.73(a)(2)(ii)		50.73(a)(2)(viii)(B)					
	20.405(a)(1)(v)	50.73(a)(2)(iii)		50.73(a)(2)(ix)					

LICENSEE CONTACT FOR THIS LER (12)

NAME Jerry Day, Licensing	TELEPHONE NUMBER	
	AREA CODE 7 1 0 1 4	3 1 7 1 3 1 - 1 7 1 0 1 3 1 3

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NRC
X	JIB	IIMQID	WILLI210	NO					

SUPPLEMENTAL REPORT EXPECTED (14)

<input type="checkbox"/> YES (If yes, complete EXPECTED SUBMISSION DATE)	<input checked="" type="checkbox"/> NO	EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

On January 5, 1986, at 1731, a Unit 1 reactor trip occurred as a result of a steam generator (S/G) D low-low level signal. The low-low level was caused by a loss of feedwater to S/G D after the main feedwater control valve for S/G D, ICF-17, failed closed. The valve failed closed when the automatic operation of its controller-driver card failed in the 7300 series process control system (PCS).

Control operators opened feedwater control bypass valve ICF-107 and later manually opened ICF-17 in an attempt to restore feedwater flow to S/G D. The attempt to manually recover from this feedwater transient was unsuccessful and a reactor trip occurred. The failed controller-driver card was replaced and the new component was calibrated and returned to service.

Unit 1 was in Mode 1 at 100% power at the time of this incident.

All systems and parameters responded as expected to the trip with no performance anomalies.

8602190729 860204  
PDR ADOCK 05000369  
S PDR

IE82  
1/1

## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

APPROVED OMB NO. 3150-0104

EXPIRES 8/31/88

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
McGuire Nuclear Station, Unit 1	0 5 0 0 0 3 6 9 8 6	—	0 0 2	—	0 0	0 2	OF 0 3

TEXT (If more space is required, use additional NRC Form 366A's) (17)

On January 5, 1986, at 1731, a Unit 1 reactor trip occurred as a result of a steam generator (S/G) D low-low level signal. The low-low level was caused by a loss of feedwater to S/G D after the main feedwater control valve for S/G D, ICF-17, failed closed. The valve failed closed when the automatic portion of its controller-driver card failed in the 7300 series process control system [EIIIS:JB] (PCS).

Control operators opened feedwater control bypass valve ICF-107 and later manually opened ICF-17 in an attempt to restore feedwater flow to S/G D. The attempt to manually recover from this feedwater transient was unsuccessful and a reactor trip occurred. The failed controller-driver card was replaced and the new component was calibrated and returned to service.

Unit 1 was in Mode 1, at 100% power at the time of this incident.

BACKGROUND

S/G water level control is accomplished by varying feedwater flow by the adjustment of the diaphragm actuated feedwater control (regulating) valves to each S/G. Level control for each S/G is accomplished through independent flow controllers which compare the feedwater flow/steam flow mismatch signal, and balances them to the S/G water level error. The level error is the difference between actual S/G water level and the programmed water level. The flow controller feeds a proportional integral (PI) signal to its controller-driver card. This card in turn feeds a valve position demand signal to an electrical-to-pneumatic converter, which feeds a signal to the valve positioner for the feedwater control valve. As a result, the feedwater control valve position is maintained proportional to the output of the flow controller.

A manual/automatic (M/A) station provides automatic or manual control of the feedwater control valves. In the automatic mode, the feedwater control valves are controlled as described above. In the manual mode, the valve positions are adjusted manually by the control operator.

DESCRIPTION OF THE EVENT

When the automatic portion of the controller-driver card in the 7300 PCS failed, the card was no longer able to receive a PI signal from the flow controller. As a result, the S/G D feedwater control valve (ICF-17) failed closed, causing a decrease in feedwater flow to S/G D. The manual portion of the controller-driver card was still operable. The control operators placed ICF-17 into "MANUAL" and reopened the valve to reestablish feedwater flow. However, S/G D level was so low that feedwater flow could not be reestablished fast enough, and a low-low level signal occurred on S/G D. As a result, the reactor and the turbine tripped.

During the investigation, it was determined that the controller-driver card in the 7300 PCS for the S/G D flow controller had failed, causing ICF-17 to fail closed. The failed card was replaced with a spare card and the instrument loop was calibrated and returned to service.

This incident pointed out the fact that once the S/G low level alarm is received, there is very little time remaining for control operators to take corrective action before the S/G low-low level reactor trip occurs. This problem was addressed in an earlier report,

## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

APPROVED OMB NO. 3150-0104

EXPIRES: 8/31/88

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
McGuire Nuclear Station, Unit 1	0 5 0 0 0 3 6 9	8 6	— 0 0 2	— 0 0	0 3	OF	0 3

TEXT (If more space is required, use additional NRC Form 366A's) (17)

LER 370/85-26. As a result of LER 370/85-26, a station problem report was initiated to review the possibility of raising the S/G low level alarm setpoint on both units. This problem does not pose a safety question, but implementation of the setpoint change may increase the unit reliability.

A review of past incident investigation reports indicates that there has been only one other reactor trip at this station as a result of a card failure (reference LER 370/84-09). Therefore, card failures resulting in reactor trips are not considered a recurring event.

A search of the Nuclear Plant Reliability Data System (NPRDS) revealed that this Westinghouse controller-driver card has failed in eleven other reportable instances.

CORRECTIVE ACTION

Immediate: Control room operators attempted to restore feedwater flow to S/G D by manually opening its feedwater bypass and control valves.

Subsequent: The failed controller-driver card was replaced with a spare card and the control loop was calibrated.

As a result of LER 370/85-26, the S/G low level alarm setpoints were raised on Units 1 and 2.

Planned: This incident investigation report will be covered with appropriate shift personnel.

The failed controller-driver card will be repaired and returned to stock.

An Operations engineer will evaluate the feasibility and impact of leaving the feedwater control bypass valve in automatic instead of manual during 0-100% power. This may provide additional response time for control operators.

SAFETY ANALYSIS:

The reactor tripped on low-low level in one steam generator (S/G), as designed, following the closing of ICF-17. S/G level was recovered by auxiliary feedwater with heat removed to the condenser. Steam pressure remained below S/G PORV setpoints, the valves did not open.

Primary parameters reacted properly as well. Loop average temperature decreased toward the no-load target following the trip, not falling lower. Pressure fell to a minimum of 2026 psig following the trip before recovering. Pressurizer level dropped to a minimum of 20% post-trip, recovering to the target (25%) 30 minutes after the trip.

Adequate core cooling was maintained at all times, emergency power was not required. The health and safety of the public were unaffected by this incident.

DUKE POWER COMPANY

P.O. BOX 33189  
CHARLOTTE, N.C. 28242

HAL B. TUCKER  
VICE PRESIDENT  
NUCLEAR PRODUCTION

TELEPHONE  
(704) 373-4531

February 4, 1986

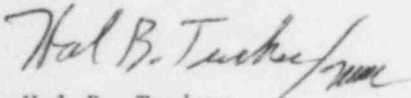
Document Control Desk  
U.S. Nuclear Regulatory Commission  
Washington, D.C. 20555

Subject: McGuire Nuclear Station, Unit 1  
Docket No. 50-369  
LER 369/86-02

Gentlemen:

Pursuant to 10 CFR 50.73 Sections (a)(1) and (d), attached is Licensee Event Report 369/86-02 concerning a Reactor Trip following a driver card failure. This event was considered to be of no significance with respect to the health and safety of the public.

Very truly yours,

  
Hal B. Tucker

JBD/jgm

Attachment

xc: Dr. J. Nelson Grace  
Regional Administrator  
U.S. Nuclear Regulatory Commission  
Region II  
101 Marietta Street, NW, Suite 2900  
Atlanta, Georgia 30323

INPO Records Center  
Suite 1500  
1100 Circle 75 Parkway  
Atlanta, Georgia 30339

M&M Nuclear Consultants  
1221 Avenue of the Americas  
New York, New York 10020

Mr. W.T. Orders  
NRC Resident Inspector  
McGuire Nuclear

American Nuclear Insurers  
c/o Dottie Sherman, ANI Library  
The Exchange, Suite 245  
270 Farmington Avenue  
Farmington, CT 06032

Darl Hood  
U.S. Nuclear Regulatory Commission  
Office of Nuclear Reactor Regulation  
Washington, D.C. 20555

IE 22  
1/1